

## *Cypraea*: A List of the Species. III.

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(1 Text figure)

THE QUESTION OF JUST which taxa should be considered valid as species of *Cypraea* (s. l.) has been subject to confusion ever since the publication of the various editions of the *Systema Naturae* of Linnaeus, starting more than 200 years ago.

Coming down to more modern times, in the first paper of the present series (DONOHUE, 1965) an analysis was made of the species considered valid by a number of modern authorities. There is no need to go into the details of that analysis again, but merely to summarize the final results, which were given in the form of 4 lists: 1) 142 "non-controversial" species accepted by both SCHILDER & SCHILDER (1964) and WAGNER & ABBOTT (1964); 2) 18 "provisional" species accepted by the Schilders but not by Wagner & Abbott; 3) 18 "provisional species accepted by Wagner & Abbott but not by the Schilders; and 4) 29 "controversial" species which at one time or another since about 1940 had been accorded specific status by one or more authorities. At that point there were, thus, 142 cowry species for the "lumpers" and 207 for the "splitters."

In the second paper of this series (DONOHUE, 1971) the foregoing analysis was up-dated by a detailed consideration of more recent opinions expressed by 2 of the foremost cypraeologists, viz. SCHILDER (1969) and BURGESS (1970). The net result then was that in Burgess' opinion there were 187 species, plus 4 either "doubtful or provisional," total 191, and that Schilder also accepted 191 taxa, 170 of which were species and 21 were "prospecies." As pointed out at that time this apparent numerical equality of 191 was an accident: some of the species accepted by Schilder were termed doubtful, variants, or not even mentioned by Burgess, while some of the species accepted by Burgess were termed prospecies, subspecies, clines, mutants, or not mentioned by Schilder. The two authorities agreed on 164 species (for the lumpers), with the total number between them being 207 (for the splitters).

Meanwhile, there has appeared a revised (and, alas, final) opinion from SCHILDER & SCHILDER (1971) and an apparently definitive book by TAYLOR & WALLS (1975). It thus becomes necessary to construct a concordance among the classic (and also apparently definitive) work of Burgess and the 2 more recent studies just cited.

Taylor & Walls, in their most welcome book, discuss and figure 187 species. Unfortunately, these 187 are not the same as the 187 of Burgess, and the new list of the Schilders contains only 164 valid species. In order to express the differences (and agreements) when all 3 sources are considered, a 2-dimensional diagram is required. This is shown in Figure 1, where the 3 circles enclose the species recognized by the Schilders, Taylor & Walls, and Burgess, respectively. Areas of common recognizance occur when the circles overlap; lists of the species which occupy the various areas of Figure 1 are presented in Tables 2 to 5.

To summarize, it is seen that there is now agreement, where all 3 circles overlap, on 158 species, and that Burgess and Taylor & Walls agree on an additional 22 species (Table 2). Furthermore, the Schilders accept 8 more (Table 3), Burgess 7 more (Table 4), and Taylor & Walls 7 more (Table 5), not recognized by either of the others. The total numbers thus are now 158 for the lumpers and 202 for the splitters.

But the story does not stop here. There are, in addition, 10 species described subsequent to the publications of the Schilders and of Burgess, 4 of which also postdate Taylor & Walls. These are presented in Table 6, together with 1 species recently separated by BURGESS (1975). Comments in a recent review by CLOVER (1976) are also included. The total number of species could, accordingly, be as large as 213. I am not sure whether there is more, or less confusion than there was in 1971.

I would like to thank Phillip Clover for many helpful comments he made during the preparation of this paper.

Table 1

Species recognized by Schilder & Schilder, by Burgess,  
and by Taylor & Walls

<i>achateidea</i> Sowerby, 1837	<i>cumingii</i> Sowerby, 1832	<i>kieneri</i> Hidalgo, 1906	<i>pulchra</i> Gray, 1824
<i>albuginosa</i> Gray, 1825	<i>cylindrica</i> Born, 1778	<i>lamarckii</i> Gray, 1825	<i>pulicaria</i> Reeve, 1846
<i>algoensis</i> Gray, 1825	<i>decipiens</i> Smith, 1880	<i>langfordi</i> Kuroda, 1938	<i>punctata</i> Linnaeus, 1771
<i>amphithales</i> Melvill, 1888	<i>declivis</i> Sowerby, 1870	<i>lentiginosa</i> Gray, 1825	<i>pyriformis</i> Gray, 1824
<i>angustata</i> Gmelin, 1791	<i>depressa</i> Gray, 1824	<i>leucodon</i> Broderip, 1828	<i>pyrum</i> Gmelin, 1791
<i>annettae</i> Dall, 1909	<i>dillwyni</i> Schilder, 1922	<i>limacina</i> Lamarck, 1810	<i>quadrinaculata</i> Gray, 1824
<i>annulus</i> Linnaeus, 1758	<i>diluculum</i> Reeve, 1845	<i>lurida</i> Linnaeus, 1758	<i>rashleighana</i> Melvill, 1888
<i>arabica</i> Linnaeus, 1758	<i>edentula</i> Gray, 1825	<i>lutea</i> Gmelin, 1791	<i>reevei</i> Sowerby, 1832
<i>arabacula</i> Lamarck, 1810	<i>eglantina</i> Duclos, 1833	<i>lynx</i> Linnaeus, 1758	<i>robertsi</i> Hidalgo, 1906
<i>argus</i> Linnaeus, 1758	<i>englerti</i> Summers & Burgess, 1965	<i>macandrewi</i> Sowerby, 1870	<i>rosselli</i> Cotton, 1848
<i>armeniaca</i> <sup>1</sup> Verco, 1912	<i>erosa</i> Linnaeus, 1758	<i>maculifera</i> Schilder, 1932	<i>sanguinolenta</i> Gmelin, 1791
<i>artuffeli</i> Jousseaume, 1876	<i>errones</i> Linnaeus, 1758	<i>mappa</i> Linnaeus, 1758	<i>saulae</i> Gaskoin, 1843
<i>asellus</i> Linnaeus, 1758	<i>erythraeensis</i> Sowerby, 1837	<i>marginalis</i> Dillwyn, 1827	<i>schilderorum</i> Iredale, 1939
<i>aurantium</i> Gmelin, 1791	<i>esontropia</i> Duclos, 1833	<i>marginata</i> Gaskoin, 1849	<i>scurra</i> Gmelin, 1791
<i>barclayi</i> Reeve, 1857	<i>exusta</i> Sowerby, 1832	<i>mariae</i> Schilder <sup>4</sup> , 1927	<i>spadicea</i> Swainson, 1823
<i>beckii</i> Gaskoin, 1836	<i>felina</i> Gmelin, 1791	<i>martini</i> Schepman, 1907	<i>spurca</i> Linnaeus, 1758
<i>bistrinotata</i> <sup>2</sup> Schilder & Schilder, 1937	<i>fimbriata</i> Gmelin, 1791	<i>mauritiana</i> Linnaeus, 1758	<i>staphylaea</i> Linnaeus, 1758
	<i>flaveola</i> <sup>2</sup> Linnaeus, 1758	<i>microdon</i> Gray, 1828	<i>stercoraria</i> Linnaeus, 1758
<i>boivini</i> Kiener, 1843	<i>friendii</i> Gray, 1831	<i>midwayensis</i> Azuma & Kurohara, 1967	<i>stolida</i> Linnaeus, 1758
<i>broderipii</i> Sowerby, 1832	<i>fultoni</i> Sowerby, 1903		<i>subviridis</i> Reeve, 1835
<i>camelopardalis</i> Perry, 1811	<i>fuscotentata</i> Gray, 1825	<i>miliaris</i> Gmelin, 1791	<i>sulcidentata</i> Gray, 1824
<i>capensis</i> Gray, 1828	<i>fuscorubra</i> Shaw, 1909	<i>minoridens</i> Melvill, 1901	<i>surinamensis</i> Perry, 1811
<i>caputdraconis</i> Melvill, 1888	<i>gambiensis</i> Shaw, 1909	<i>moneta</i> Linnaeus, 1758	<i>talpa</i> Linnaeus, 1758
<i>caputserpentis</i> Linnaeus, 1758	<i>gangranosa</i> Dillwyn, 1817	<i>mus</i> Linnaeus, 1758	<i>teramachii</i> Kuroda, 1938
<i>carneola</i> Linnaeus, 1758	<i>gaskoini</i> Reeve, 1846	<i>nigropunctata</i> Gray, 1828	<i>teres</i> Gmelin, 1791
<i>catholicorum</i> Schilder & Schilder, 1937	<i>globulus</i> Linnaeus, 1758	<i>nivosa</i> Broderip, 1827	<i>tessellata</i> Swainson, 1822
	<i>goodallii</i> Sowerby, 1832	<i>nucleus</i> Linnaeus, 1758	<i>testudinaria</i> Linnaeus, 1758
<i>caurica</i> Linnaeus, 1758	<i>gracilis</i> Gaskoin, 1849	<i>ocellata</i> Linnaeus, 1758	<i>teulerei</i> Cazenavette, 1845 <sup>7</sup>
<i>cernica</i> Sowerby, 1870	<i>guttata</i> Gmelin, 1791	<i>onyx</i> Linnaeus, 1758	<i>tigris</i> Linnaeus, 1758
<i>cervinetta</i> Kiener, 1843	<i>hammondae</i> Iredale, 1939	<i>ovum</i> Gmelin, 1791	<i>turdus</i> Lamarck, 1810
<i>cervus</i> Linnaeus, 1771	<i>helvola</i> Linnaeus, 1758	<i>owenii</i> Sowerby, 1837	<i>ursellus</i> Gmelin, 1791
<i>childreni</i> Gray, 1825	<i>hirasei</i> Roberts, 1913	<i>pantherina</i> Solander <sup>5</sup> , 1786	<i>valentia</i> Perry, 1811
<i>chinensis</i> Gmelin, 1791	<i>hirundo</i> Linnaeus, 1758	<i>pallida</i> Gray, 1824	<i>ventriculus</i> Lamarck, 1810
<i>cicercula</i> <sup>2</sup> Linnaeus, 1758	<i>histrion</i> Gmelin, 1791	<i>pallidula</i> Gaskoin, 1849	<i>venusta</i> Sowerby, 1846
<i>cinerea</i> Gmelin, 1791	<i>hungerfordi</i> Sowerby, 1888	<i>petitiana</i> <sup>6</sup> Crosse, 1872	<i>vitellus</i> Linnaeus, 1758
<i>citrina</i> Gray, 1825	<i>interrupta</i> Gray, 1824	<i>picta</i> Gray, 1824	<i>vredenburgi</i> Schilder, 1927
<i>clandestina</i> Linnaeus, 1767	<i>irrorata</i> Gray, 1828	<i>piperita</i> Gray, 1825	<i>walkeri</i> Sowerby, 1832
<i>contaminata</i> Sowerby, 1832	<i>isabella</i> Linnaeus, 1758	<i>poraria</i> Linnaeus, 1758	<i>xanthodon</i> Sowerby, 1832
<i>coheni</i> Cox, 1873	<i>isabellamexicana</i> <sup>3</sup> Stearns, 1893	<i>porteri</i> Cate, 1966	<i>zebra</i> Linnaeus, 1758
<i>cribraria</i> Linnaeus, 1758	<i>katsuae</i> Kuroda, 1960	<i>pulchella</i> Swainson, 1823	<i>ziczac</i> Linnaeus, 1758
			<i>zonaria</i> Gmelin, 1791

<sup>1</sup> Given as a subspecies of *hesitata* Iredale, 1916 by TAYLOR & WALLS. However, *armeniaca* is the prior name, so it must be the species name unless both taxa are accorded specific status (as is done by Burgess).

<sup>2</sup> SCHILDER (1966), after considering the type specimens of Linnaeus, proposed the following name changes:

former name	new name
<i>bistrinotata</i> Schilder & Schilder, 1937	<i>cicercula</i> Linnaeus, 1758
<i>cicercula</i> Linnaeus, 1758	<i>lienardi</i> Jousseaume, 1874
<i>labrolineata</i> Gaskoin, 1849	<i>flaveola</i> Linnaeus, 1758

None of these changes was recognized by either Burgess or Taylor & Walls. The Schilders must have had second thoughts, however, because in SCHILDER & SCHILDER (1971) the first 2 of the above changes were not accepted, and only the third was. This is the course adopted in the present paper. It must be remarked that Schilder was not consistent in this matter, for in his 1969 paper he used none of the changes he had proposed in 1966.

<sup>3</sup> Because Stearns hyphenated the name *isabella-mexicana* in his original description, if this taxon is accorded specific status it

Table 2

Species recognized by Taylor &amp; Walls and by Burgess

	Status in Schilder & Schilder
<i>bregeriana</i> Crosse, 1868	subsp. <i>walkeri</i>
<i>comptonii</i> Gray, 1847	subsp. <i>piperita</i>
<i>cribellum</i> Gaskoin, 1849	subsp. <i>cribraria</i>
<i>dayritiana</i> Cate, 1963	syn. <i>pallidula</i>
<i>eburnea</i> Barnes, 1824	subsp. <i>miliaris</i>
<i>gondwanalandensis</i> Burgess, 1970	[new]
<i>granulata</i> Pease, 1862	subsp. <i>nucleus</i>
<i>grayana</i> Schilder, 1936	subsp. <i>arabica</i>
<i>humphreysi</i> <sup>8</sup> Gray, 1825	subsp. <i>lutea</i>
<i>leviathan</i> Schilder & Schilder, 1937	subsp. <i>carneola</i>
<i>luchuana</i> Kuroda, 1966	subsp. <i>pallidula</i>
<i>mauiensis</i> Burgess, 1967	subsp. <i>bistrinotata</i>
<i>musumea</i> Kuroda & Habe, 1961	syn. <i>katsuae</i>
<i>obvelata</i> Lamarck, 1810	subsp. <i>annulus</i>
<i>ostergaardi</i> Dall, 1921	subsp. <i>boivini</i>
<i>rabaulensis</i> Schilder, 1964	subsp. <i>katsuae</i>
<i>semitplota</i> Mighels, 1845	subsp. <i>limacina</i>
<i>serrulifera</i> Schilder & Schilder, 1938	subsp. <i>minoridens</i>
<i>steineri</i> <sup>9</sup> Cate, 1969	syn. <i>coxeni</i>
<i>subteris</i> Weinkauff, 1881	subsp. <i>teres</i>
<i>summersi</i> Schilder, 1958	subsp. <i>pallidula</i>
<i>thomasi</i> <sup>10</sup> Crosse, 1865	syn. <i>beckii</i> ?

<sup>8</sup> As "yaloka Steadman & Cotton 1943" in Burgess. CERNOHORSKY (1965) considers *yaloka* a junior synonym of *humphreysi* [sic] and that it does not even merit to be retained as a "form" name.

<sup>9</sup> This unique specimen is considered to be a bulbous form of *coxeni* by CLOVER, 1976.

<sup>10</sup> The specific status of this unique specimen in the British Museum (Natural History) has been the subject of much controversy which will not be detailed here, and which will not be settled until more specimens turn up. Sufficeth to say that it has variously been termed a synonym of *beckii*, *macandrewi*, and *ostergaardi*, as well as a valid species.

must be as given here, and not as *mexicana* as done by the Schilders.

<sup>4</sup> Attributed to Schilder & Schilder, 1927 by BURGESS (1970: 274); the paper cited there, however, is by F. A. Schilder only.

<sup>5</sup> BURGESS (1970: 204) gives the author as Lightfoot, 1786, citing DANCE, 1962 who is said to have said that the date of Solander's death made it impossible for him to have been the author of the pertinent reference.

<sup>6</sup> Considered a "questionable species" by BURGESS (1970: 85) who conjectured that morphological differences between *petiti-ana* and *pyrum* could be explained if the former were simply a dwarf form of the latter.

<sup>7</sup> Date of *teuleri* given as 1846 by the Schilders. Taylor & Walls give no dates. BURGESS (1970: 58) accepts 1845 as the correct date

Table 3

Species recognized only by Schilder &amp; Schilder

	Burgess	Taylor & Walls
<i>alfredensis</i> Schilder & Schilder, 1929	syn. <i>edentula</i>	syn. <i>edentula</i>
<i>aurora</i> <sup>11</sup> Lamarck, 1810	syn. <i>aurantium</i>	syn. <i>aurantium</i>
<i>bicolor</i> Gaskoin, 1849	syn. <i>piperita</i>	syn. <i>piperita</i>
<i>catei</i> Schilder, 1963	syn. <i>venusta</i>	syn. <i>venusta</i>
<i>hartsmithi</i> Schilder, 1967	not mentioned	var. <i>comptoni</i> [sic]?
<i>listeri</i> Gray, 1824	syn. <i>felina</i>	var. <i>felina</i>
<i>margarita</i> Dillwyn, 1817	syn. <i>cicercula</i> ?	subsp. <i>cicercula</i>
<i>thersites</i> Gaskoin, 1849	subsp. <i>friendii</i> ?	subsp. <i>friendii</i>

<sup>11</sup> Why the Schilders separated this taxon from *aurantium* Gmelin, 1791 is a mystery.

Table 4

Species recognized only by Burgess

	Status in both Schilder & Schilder and Taylor & Walls
<i>aequinoctialis</i> Schilder, 1933	subsp. <i>annettae</i>
<i>cassiaui</i> Burgess, 1965	subsp. <i>nucleus</i>
<i>coheni</i> Burgess, 1965	subsp. <i>fusciorubra</i>
<i>coloba</i> Melvill, 1888	subsp. <i>chinensis</i>
<i>fernandoi</i> Cate, 1969	subsp. <i>xanthodon</i>
<i>hesitata</i> Iredale, 1916	subsp. <i>armeniaca</i>
<i>kuroharai</i> Kuroda & Habe, 1961	subsp. <i>schilderorum</i>

Table 5

Species recognized only by Taylor &amp; Walls

	Status in Burgess	Schilder & Schilder
<i>bernardi</i> Richard, 1974	[new]	[new]
<i>cruickshanki</i> Kilburn, 1972	[new]	[new]
<i>fischeri</i> Vayssière, 1910	var. <i>gaskoini</i>	subsp. <i>gaskoini</i>
<i>haddnighiae</i> Trenberth, 1973	[new]	[new]
<i>joycae</i> Clover, 1970	[new]	[new]
<i>nebrites</i> Melvill, 1888	syn. <i>erosa</i> ?	subsp. <i>erosa</i>
<i>sakurai</i> Habe, 1970	[new]	[new]

Table 6  
Additional Species

	Clover	Taylor & Walls
<i>angelicae</i> Clover, 1974	valid	syn. <i>petitiana</i>
<i>eugeniae</i> Cate, 1975	semifossil <i>xanthodon</i>	[new]
<i>gloriosa</i> Shikama, 1971	form of <i>gondwana-</i>	syn. <i>gondwanaland-</i>
	<i>landensis</i>	<i>ensis</i>
<i>jeaniana</i> Cate, 1968	valid	var. <i>friendii</i>
<i>ju-kui</i> Shikama, 1974	syn. <i>cruickshanki</i>	[overlooked]
<i>kingae</i> Rehner & Wilson, 1975	valid	[new]
<i>lisetae</i> Kilburn, 1975	valid	var. <i>felina</i>
<i>maricola</i> Cate, 1976	valid	[new]
<i>perlae</i> Lopez & Chiang, 1975	valid (probably)	[new]
<i>propinqua</i> <sup>12</sup> Garrett, 1879	—	syn. <i>carneola</i>
<i>stohleri</i> Cate & Schilder, 1968	syn. <i>contaminata</i>	subsp. <i>pallida</i>

<sup>12</sup> Considered separable from *carneola* by BURGESS, 1975 (but not by the Schilders).

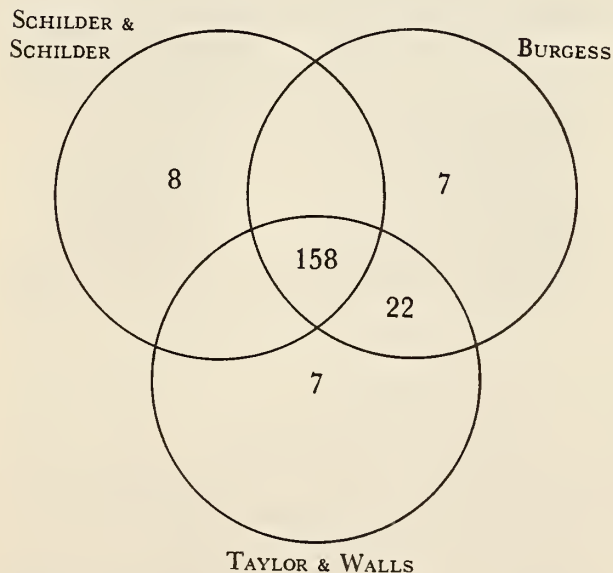


Figure 1

Numbers of species recognized by SCHILDER & SCHILDER (1971), BURGESS (1970), and TAYLOR & WALLS (1975). Number of species accepted by each lies within the respective circles, with acceptances in common as shown.

**Addendum on Subspecies:** BURGESS (1970) does not recognize subspecies, in distinction from SCHILDER & SCHILDER (1971) and TAYLOR & WALLS (1975). Taylor & Walls list 57 subspecies, and of these the Schilders consider 1 a valid species, 28 are synonyms, and 28 are also subspecies. Conversely, the Schilders list 97 subspecies, and of these Taylor & Walls consider 17 valid species, 25 are synonyms, 30 are also subspecies, 23 are variants, and 2 are not mentioned. Tabulation of these 99 taxa would add an inordinate amount of space to this paper, but interested persons could obtain these by requesting them from me.

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